

Features

- P-Channel, -5V Logic Level Control
- Very low on-resistance $R_{DS(on)}$ @ $V_{GS} = -4.5V$
- Fast Switching
- Enhancement mode
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant


Halogen-Free

Part ID	Package Type	Marking	Tape and reel information
VSP020P06MS	PDFN5x6	020P06M	3000pcs/reel

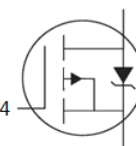
V_{DS}	-60	V
$R_{DS(on),TYP} @ V_{GS} = -10V$	10	mΩ
$R_{DS(on),TYP} @ V_{GS} = -4.5V$	13	mΩ
I_D	-65	A

PDFN5x6


Pin1



Drain Pin5-8



Gate Pin4

Source Pin1-3

Maximum ratings, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
VGS	Gate-Source Voltage		±20	V
V(BR)DSS	Drain-Source Breakdown Voltage		-60	V
TSTG TJ	Storage and operating temperature range①		-55 to 150	°C
IS	Diode Continuous Forward Current	Tc=25°C	-65	A
Mounted on Large Heat Sink				
ID	Continuous Drain current @VGS=-10V	Tc=25°C	-65	A
		Tc=100°C	-42	A
IDM	Pulse Drain Current Tested ②	Tc=25°C	-230	A
PD	Maximum Power Dissipation	Tc=25°C	83	W
RθJC	Thermal Resistance-Junction to Case		1.5	°C/W
RθJA	Thermal Resistance Junction-Ambient		48	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ③		289	mJ

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-60	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =-60V,V _{GS} =0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(Tc=125°C)	V _{DS} =-60V,V _{GS} =0V	--	--	-100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V,V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =-250μA	-1.0	-2.0	-3.0	V
R _{DS(ON)}	Drain-Source On-State Resistance ②	V _{GS} =-10V, I _D =-40A	--	10	15	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance ②	V _{GS} =-4.5V, I _D =-20A	--	13	20	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-30V,V _{GS} =0V, f=1MHz	--	6430	--	pF
C _{oss}	Output Capacitance		--	340	--	pF
C _{rss}	Reverse Transfer Capacitance		--	310	--	pF
Q _g	Total Gate Charge	V _{DS} =-30V,I _D =-20A, V _{GS} =-10V	--	85	--	nC
Q _{gs}	Gate-Source Charge		--	18	--	nC
Q _{gd}	Gate-Drain Charge		--	22	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-30V, I _D =-10A, R _G =6.8Ω, V _{GS} =-10V	--	19	--	nS
t _r	Turn-on Rise Time		--	24	--	nS
t _{d(off)}	Turn-Off Delay Time		--	92	--	nS
t _f	Turn-Off Fall Time		--	43	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _{SD} =-2A,V _{GS} =0V	--	-0.71	-1.2	V
t _{rr}	Reverse Recovery Time	T _J =25°C,I _{sd} =-20A, V _{GS} =0V	--	32	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=-500A/μs		185		nC

NOTE:

① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 300μs; duty cycle ≤ 2%.

③ Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = -34A, V_{GS} = -10V. Part not recommended for use above this value

Typical Characteristics

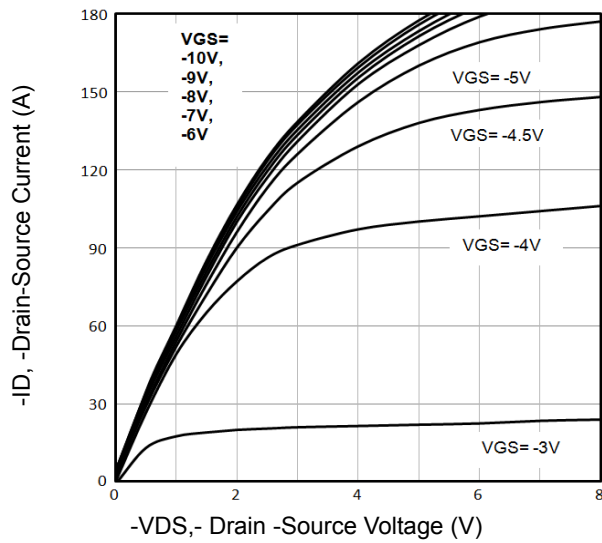


Fig1. Typical Output Characteristics

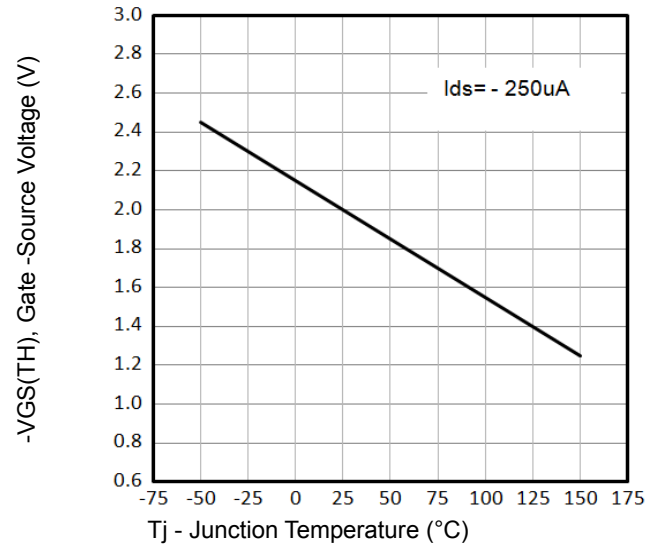


Fig2. $-V_{GS(TH)}$ Gate-Source Voltage Vs. T_j

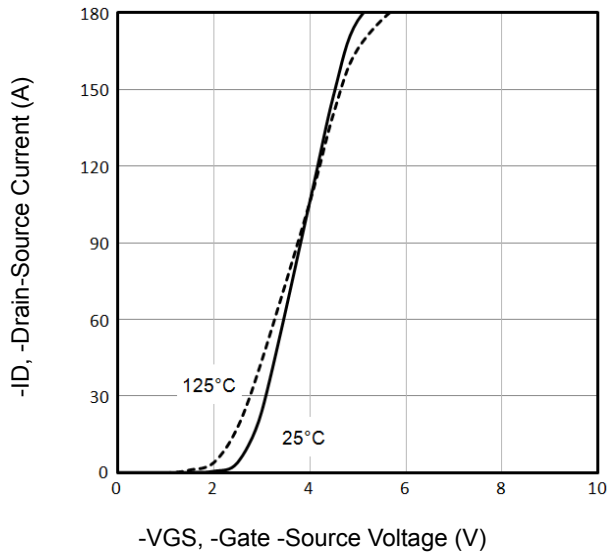


Fig3. Typical Transfer Characteristics

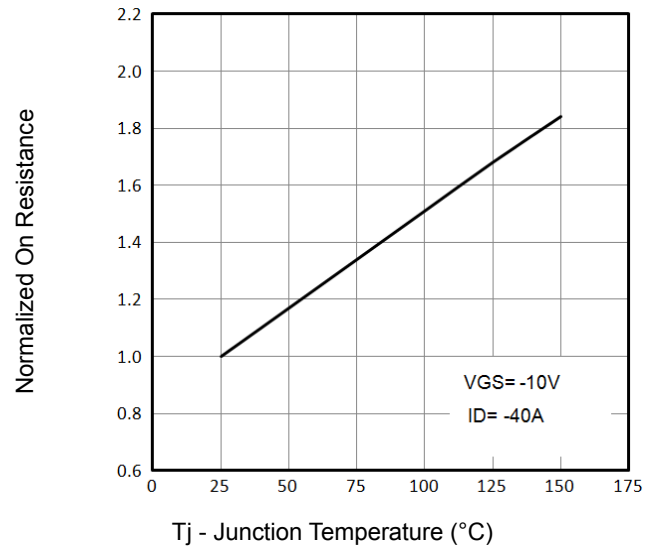


Fig4. Normalized On-Resistance Vs. T_j

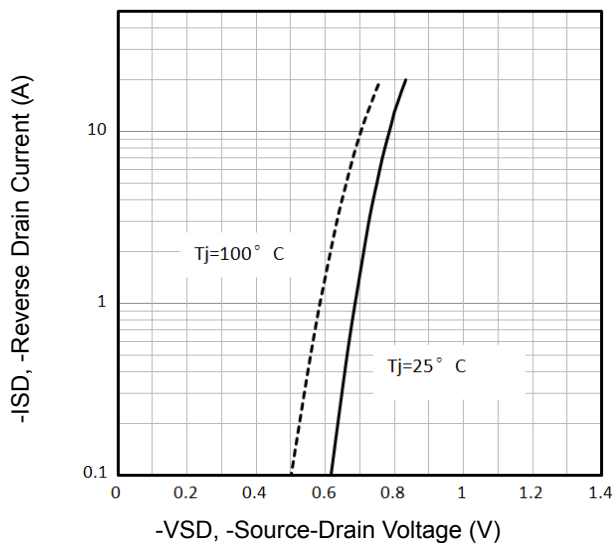


Fig5. Typical Source-Drain Diode Forward Voltage

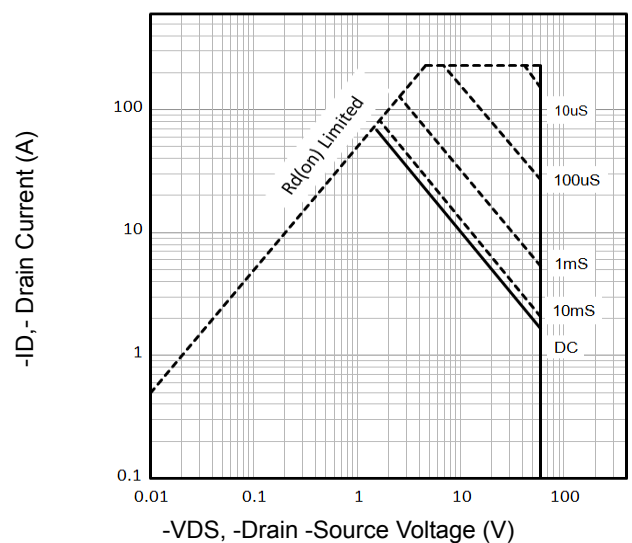


Fig6. Maximum Safe Operating Area

Typical Characteristics

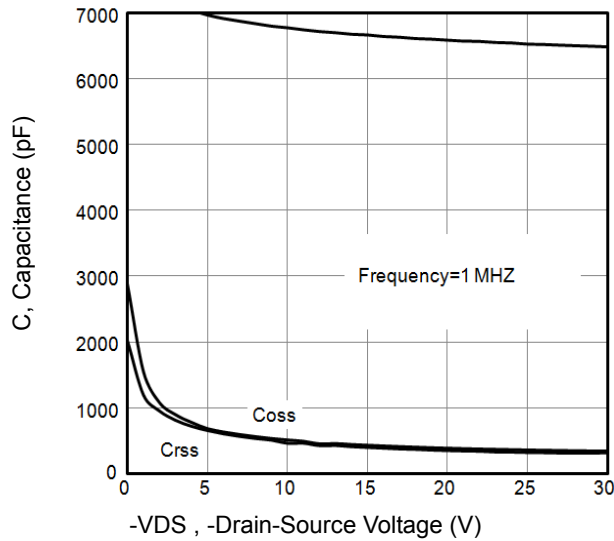


Fig7. Typical Capacitance Vs. Drain-Source Voltage

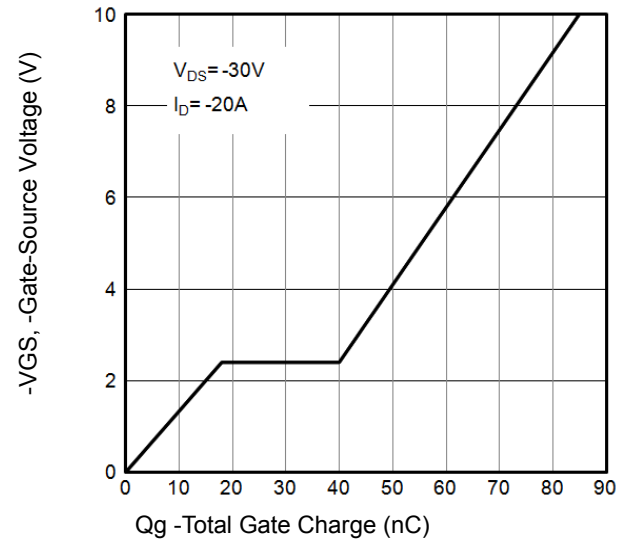


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

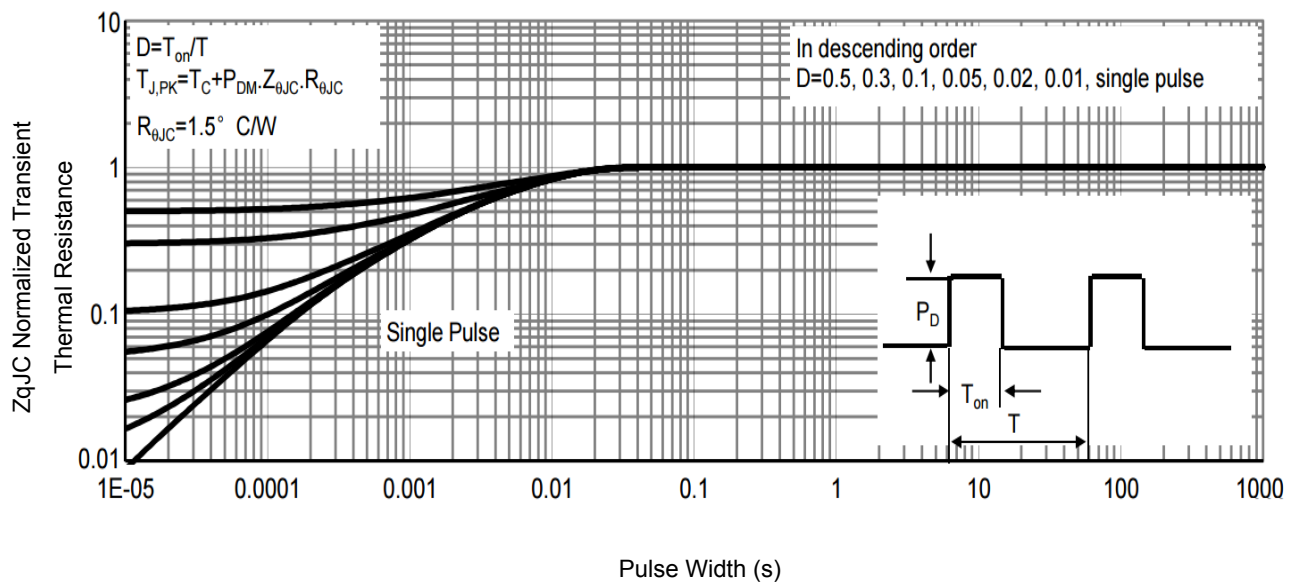


Fig9. Normalized Maximum Transient Thermal Impedance

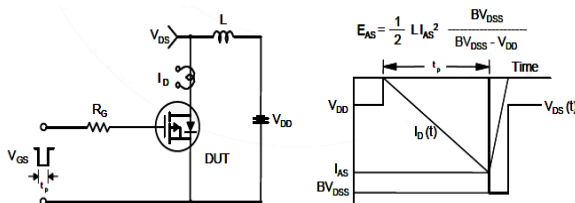


Fig10. Unclamped Inductive Test Circuit and Waveforms

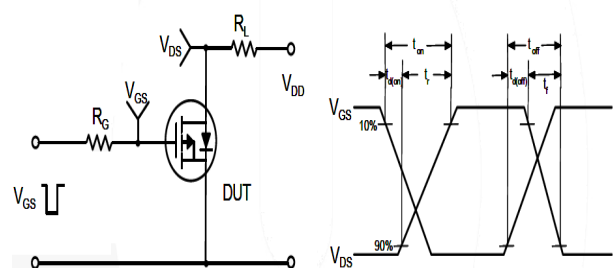
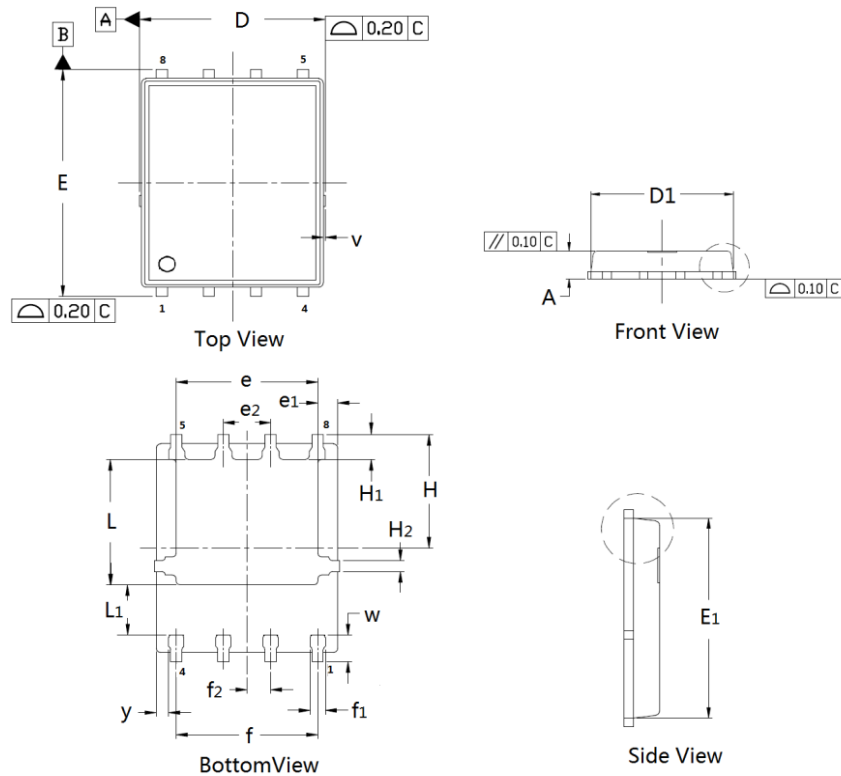


Fig11. Switching Time Test Circuit and waveforms

PDFN5×6 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.02	1.10	D	4.90	4.98	5.10
D ₁	4.80	4.89	5.00	E	6.00	6.11	6.20
E ₁	5.65	5.74	5.85	e	3.72	3.80	3.92
e ₁	--	0.54	--	e ₂	--	1.27	--
f	--	3.82	--	f ₁	0.31	0.37	0.51
f ₂	--	0.64	--	H	--	3.15	--
H ₁	0.59	0.63	0.79	H ₂	0.26	0.28	0.32
L	3.38	3.45	3.58	L ₁	--	1.39	--
v	--	0.13	--	w	0.64	0.68	0.84
y	--	0.34	--		--		--

Customer Service

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